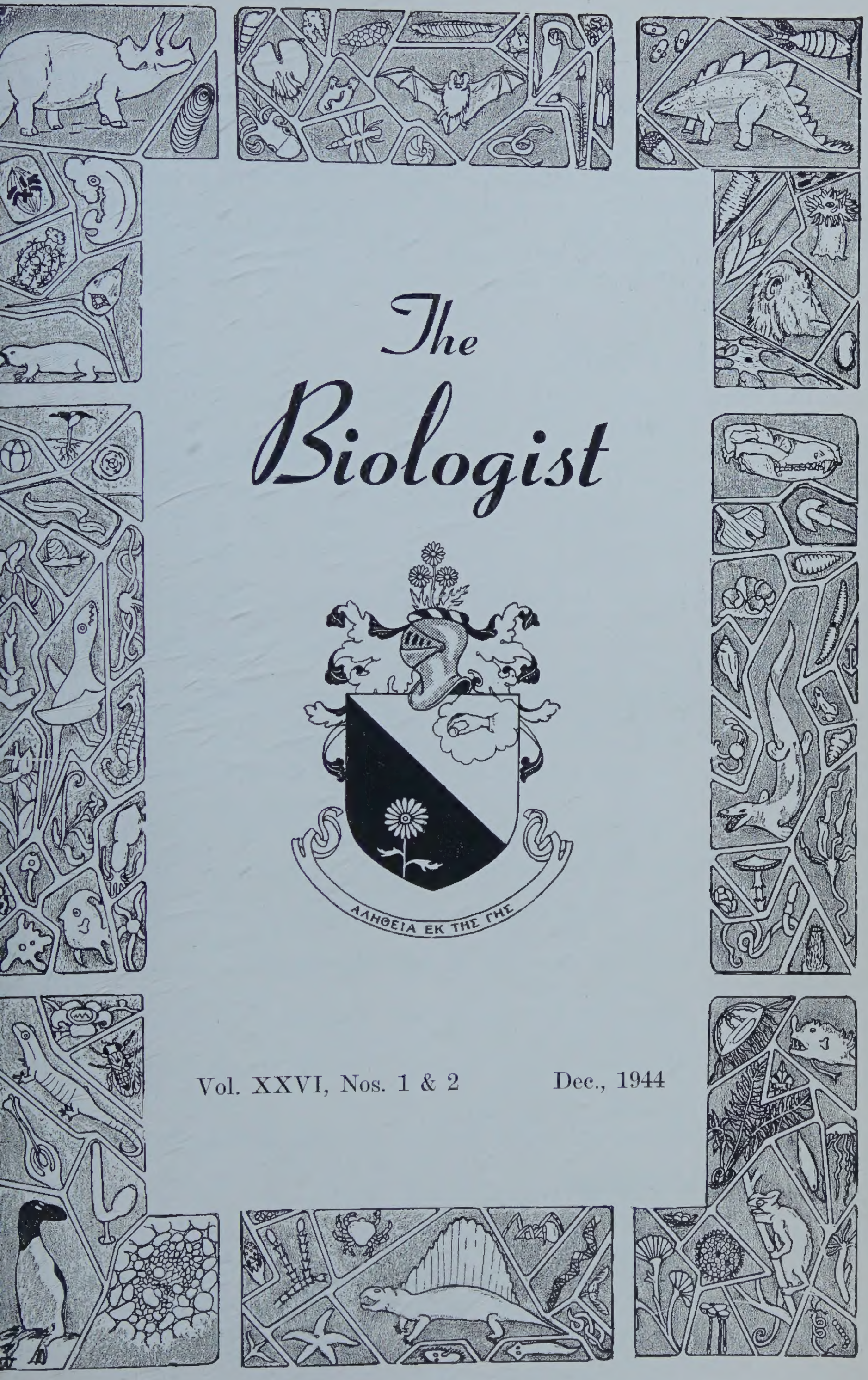


The Biologist

ΑΛΗΘΕΙΑ ΕΚ ΤΗΣ ΓΗΣ

Vol. XXVI, Nos. 1 & 2 Dec., 1944

Phi Sigma

BIOLOGICAL HONOR SOCIETY

"The object of Phi Sigma is to promote interest in biological research. Although originally designated as an honorary biological research society, it should not be considered as a working guild of biologists interested in research. In effect, election to Phi Sigma should be an opportunity for better work, rather than merely election to an honorary society."

Mile Posts:

1915	March 17, Alpha Chapter organized, Ohio State University, Columbus.
1916	May, Central Governing Body organized, BIOLOGIST first issued.
1917	June, last War-time BIOLOGIST issued.
1921	February, BIOLOGIST revived.
1924	December, First National Meeting, Constitution revised, Washington, D.C.
1925	December, Second National Meeting, First Science Program, Kansas City.
1926	December, Third National Meeting, Second Science Program, Philadelphia.
1927	December, Third Science Program, Nashville.
1928	December, Fourth National Meeting, Coat-of-Arms adopted, Fourth Science Program, New York.
1930	January, Council Meeting, Ritual Revised, Norman, Okla.
	December, Fifth National Meeting, Fifth Science Program, Cleveland.
1931	Phi Sigma Letters Registered, U. S. Patent Office.
1932	December, Sixth Science Program, Atlantic City.
1933	June, Sixth National Meeting, Seventh Science Program, Chicago.
1935	December, Seventh National Meeting, Eighth Science Program, St. Louis.
1937	December, Eighth National Meeting, Ninth Science Program, Indianapolis.
1939	December, Ninth National Meeting, Tenth Science Program, Silver Anniversary, Ohio State University, Columbus.
1942	December, Tenth National Meeting, Dallas, Texas.

Expansion:

The Constitution provides that: "An active chapter may be established in any institution of learning which requires for graduation the equivalent of four years of collegiate work, and which is equipped with facilities for research work. - - - - Any petitioning group must be active for at least one year before it may be granted a charter."

THE BIOLOGIST

Vol. XXVI Denver, Colo., Dec., 1944 Nos. 1 & 2

Published by the Phi Sigma Society, an organization devoted to the promotion of interest in biological research, founded at Ohio State University, March 17, 1915. The Biologist is the official quarterly publication of the society, issued ordinarily in October, December, February and April, as a medium of exchange between chapters, as an interpreter of Council policies, and as a stimulus to the fellowship in science for which Phi Sigma stands.

Council

•

HONORARY PRESIDENT

Dr. Leon J. Cole (Zeta '25)
Professor of Genetics,
University of Wisconsin,
Madison, Wisconsin

•

CHANCELLOR

Dr. Paul A. Warren (Beta '20)
Botany Department,
Tufts College,
Medford, Massachusetts

•

VICE-CHANCELLOR

Dr. Fred A. Barkley (Omega '28)
Dept. of Botany and Bacteriology
and Herbarium,
Univ. of Texas, Austin.

•

SECRETARY

Dr. A. I. Ortenburger (Beta '19)
Zoology Department,
University of Oklahoma,
Norman, Oklahoma

•

TREASURER

Erwine Hall Stewart (Epsilon '17)
Mesa, Colorado

•

ACTING EDITOR

Dr. Edna Higbee
2845 Broadway Ave.,
S. Hills Sta.,
Pittsburgh, Pennsylvania

Contents

•

Notes on the Subterranean Waters of the Florida Peninsula with Particular Reference to Their Crustacean Fauna 6
Horton H. Hobbs, Jr.

Dr. George Lynn Cross 9

Voyage to the Straits of Magellan 10
Arthur C. Twomey

Anti-Reticular Sero-Therapy 20
Bessie Dituri

News Letters 23

REGULAR FEATURES

Book Reviews 25

Advertising 36

•

Directory

OF ALL ACTIVE AND INACTIVE CHAPTERS

The list of chapter officers for this school year will be found in the CHAPTER NEWS section of Vol. XXVI.

ALPHA

Ohio State University, Columbus, Ohio, founded March 17, 1915, (Inactive).

BETA

University of Michigan, Ann Arbor, Michigan, founded June 3, 1916.

DELTA

University of Maine, Orono, Maine, founded January 27, 1917, (Inactive).

EPSILON

University of Denver, Denver, Colorado, founded March 5, 1917.

ZETA

University of Wisconsin, Madison, Wisconsin, founded May 30, 1917.

ETA

University of Akron, Akron, Ohio, founded April 20, 1921.

THETA

Michigan State College, East Lansing, Michigan, founded April 9, 1921, (Inactive).

IOTA

Washington University, St. Louis, Missouri, founded May 28, 1921.

KAPPA

University of Kansas, Lawrence, Kansas, founded May 31, 1921.

LAMBDA

Montana State University, Missoula, Montana, founded May 4, 1921.

MU

University of California, Berkeley, California, founded April 27, 1922.

NU

Washington and Jefferson College, Washington, Pennsylvania, founded May 11, 1922.

XI

University of Nebraska, Lincoln, Nebraska, founded May 3, 1934, (Inactive).

OMICRON

University of North Dakota, Grand Forks, North Dakota,
founded May 26, 1924, (Inactive).

PI

Emory University, Georgia, founded January 3, 1925.

RHO

University of Illinois, Urbana, Illinois, founded March 28, 1925.

SIGMA

University of Florida, Gainesville, Florida, founded December 4, 1925.

TAU

Duke University, Durham, North Carolina, founded March 4, 1926.

UPSILON

Miami University, Oxford, Ohio, founded May 7, 1926.

PHI

University of New Hampshire, Durham, New Hampshire, founded May 21, 1926.

CHI

Montana State College, Bozeman, Montana, founded February 11, 1927.

PSI

University of Washington, Seattle, Washington, founded April 7, 1928.

OMEGA

University of Oklahoma, Norman, Oklahoma, founded March 24, 1928.

ALPHA ALPHA

University of Southern California, Los Angeles, California, founded March, 1928

ALPHA BETA

Mount Union College, Alliance, Ohio, founded May 17, 1928.

ALPHA GAMMA

University of South Dakota, Vermillion, South Dakota, founded May 15, 1928, (Inactive).

ALPHA DELTA

Lawrence College, Appleton, Wisconsin, founded March 7, 1929, (Inactive).

ALPHA EPSILON

University of Pittsburgh, Pittsburgh, Pennsylvania, founded March 23, 1929.

ALPHA ZETA

College of William and Mary, Williamsburg, Virginia, founded April 19, 1930, (Inactive).

ALPHA ETA

Oklahoma Agricultural and Mechanical College, Stillwater, Oklahoma, founded March 13, 1930.

ALPHA THETA

State College of Washington, Pullman, Washington, founded May, 1930.

ALPHA IOTA

Bucknell University, Lewisburg, Pennsylvania, founded January 9, 1932.

ALPHA KAPPA

Hunter College, New York City, founded January 8, 1932.

ALPHA LAMBDA

University of Utah, Salt Lake City, Utah, founded February 13, 1932.

ALPHA MU

University and State College of Oregon, Eugene-Portland-Corvallis, Oregon, founded November 18, 1933.

ALPHA NU

University of New Mexico, Albuquerque, New Mexico, founded April 21, 1935.

ALPHA XI

Rhode Island State College, Kingston, Rhode Island, founded May 17, 1935.

ALPHA OMICRON

Marquette University, Milwaukee, Wisconsin, founded June 18, 1938.

ALPHA PI

University of Colorado, Boulder, Colorado, founded May 24, 1941.

Notes on the Subterranean Waters of the Florida Peninsula with Particular Reference to Their Crustacean Fauna

Horton H. Hobbs, Jr.
Department of Biology, University of Florida

There exists in the peninsula of Florida an extensive system of underground, water-filled channels and openings in which, as we are just discovering, there occur large numbers of animal species adapted to subterranean life. The region being of such low elevation and geologically so young, the extent of the underground water-system would at first sight seem surprising; it results from the presence of large areas of a very soft, porous, and highly soluble rock, the Ocala limestone.

With the possible exception of the extreme western part of Florida the Ocala Limestone (an Eocene deposit) extends throughout almost the entire state. Deeply buried in the south, and more shallowly toward the Georgia line, it is domed upward in the central part of the peninsula and again west of the Apalachicola River. In the peninsula it is exposed (or lies near the surface) throughout an area approximately 150 miles in length by 60 miles in width, extending from Ocala and Alachua westward to the Gulf, and from Ellaville to Lacoochee in a north-south direction. Most of this area is honeycombed with solution cavities in the form of chimneys, fissures, small caverns, and sinks with steep or gently sloping walls, relatively few of which reach the water table. The ground-water level is not stable, and occasionally in seasons of drought a solution pocket in which the subterranean water is normally exposed as a small pool becomes dry.

Most of these exposures of subterranean waters are small, with as little as four cubic feet of water accessible; but others are more extensive, several having a surface area of about 2,000 square feet.

In order to give some idea as to the nature of these puddles and ponds of underground water, examples of three markedly different types will be described.

Hog Sink (Alachua County, Florida, (Sec. 24, Twp. 10S, R. 18E)) is a small sink-hole at the bottom of which is a small cavern leading underground from the bottom of the sink proper. Here, during low water, some 30 feet below the surface of the ground, is a pool approximately 30 by 100 feet in area, and ranging in depth from a shallow margin toward the entrance of the cavern to eight to ten feet near the middle. Overhanging the pond is another opening in the form of a chimney which drops straight down to the water. During the dry seasons the water level drops about four feet, revealing more fully the extent of the cave. Should this cavern be visited when the water table is high, one would not suspect that there was another opening nor would he be able to ascertain its area without diving below a relatively low ceiling which becomes submerged about 40 feet from the entrance. During high water the northern portion of the cavern is completely cut off from the small southern end. The light is very dim, but with a flashlight it can be seen that the water is clear, although occasionally there is a thin film of detritus on the surface. The bottom consists of a layer of mud, sand, and silt, with an occasional limerock outcrop.

Squirrel Chimney (Alachua County, Florida, (Sec. 21, Twp. 9S, R. 18E)) is, as its name indicates, a circular solution cavity with almost vertical walls, the latter supporting a luxuriant growth of liverworts, mosses, and ferns. This chimney penetrates the surface soil and limestone to a depth of 50 feet where it strikes the water table. Debris has fallen into the sink and has accumulated at the water level so that a little less than half of the opening contains water; the rest of it is covered with a layer of fallen leaves supported by dead tree trunks and limbs. Within six to eight feet of the bottom a small opening about three feet in diameter leads into a fissure about 25 yards long and four feet wide, the whole bottom of which is filled with water ranging in depth from a few inches to 30 feet at the deepest place sounded. The appearance of the water is much the same as that found in Hog Sink.

Huggins Cave (Alachua County, Florida) is incorrectly named, since it is nothing more than a narrow fissure which is covered only at one end. The fissure is approximately 50 feet deep, and the high vertical walls are matted with a thick growth of liverworts, mosses, and ferns. The floor of the cave-like portion dips below the water table to a depth of about three feet. Rocks, mud, and an abundance of decaying organic material make up the bed of this small, underground pool. As in the solution cavities previously mentioned, the water is very clear.

Other types of situations exist which should be described in order to give a more complete picture of the surface exposures of the subterranean waters, but these can only be briefly mentioned. Numerous springs are found in the peninsular region, some of which support a spelean fauna. Some of the open sinkholes have subterranean connections, their clear water reflecting shades of blue against the rock sides, and their bottoms sandy and detritus-covered; these have added much to our knowledge of the subterranean waters of the Florida sink and cave regions. Many wells in both rural and civic areas have penetrated these waters and have brought to light, by means of well-buckets and pumps, cavernicolous crustaceans of several types.

With one or two exceptions, in all of the surface exposures of subterranean water that I have seen the water is very clear, and where depth and light are sufficiently great it appears some shade of blue or bluish-green. The water of these exposures ranges in temperature from 54 to 72 degrees F., and is neutral or slightly basic, the average pH being around 7.0-7.1.

There is considerable indirect evidence that in the peninsula there are many more or less separate underground streams, or if not streams, somewhat isolated water systems. I have never detected any current in the subterranean exposures, but there are numerous large surface springs from which prodigious quantities of water issue, and in the channels supplying these springs the water must have an appreciable or even rapid current. That there are or have been definitely isolated or semi-isolated sub-surface water systems seems to be quite evident when the cavernicolous faunas of their surface exposures are compared.

The more conspicuous elements of the aquatic subterranean fauna are the several albinistic crayfish, a large shrimp, Macrobrachium sp. a cyprinid minnow tentatively identified as Erimystax harperi (Fowler) which in general appearance is not markedly different from the epigene form, the ubiquitous eastern mosquito fish, Gambusia affinis holbrooki (Girard), and a catfish, *Amieurus natalis erebennus* Jordan. Common, but generally decidedly less conspicuous, are an albinistic isopod, *Asellus hobbsi* Maloney, an amphipod, *Crangonyx hobbsi* Shoemaker, and an albinistic copepod. As would be expected, many other organisms have invaded these exposed waters, and have seemingly found there a congenial habitat. However, they are in no sense to be considered truly hypogeic animals; for instance, common epigene representatives of beetles, spring-tails, mayflies, dragonflies, mosquitoes, midges, etc. are inhabitants of the exposed subterranean waters.

As known at present, the obligate crustacean fauna of these subterranean water systems includes a copepod, the amphiped and isopod mentioned above, five crayfishes (*Procambarus pallidus* (Hobbs), *P. lucifugus lucifugus* (Hobbs), *P. lucifugus alachua* (Hobbs), *P. acherontis* (Lunnberg) and *Troglocambarus maclanei* Hobbs), and a large shrimp, *Macrobrachium sp.* It is questionable whether this latter form is an obligate.

The distribution of the known localities of the various crustacean cavernicoles seems to indicate that there are at least four more or less distinct underground water systems in the peninsular region. Macrobrachium has been taken from Silver Springs, Marion County, and from an artesial well at St. Augustine, St. Johns County. *Procambarus acherontis* is known to occur in "an underground rivulet" near Lake Brantley, Orange County, and in Palm Springs, Seminole County. *Procambarus lucifugus lucifugus* has been collected from localities in Citrus and Hernando counties, and *Procambarus lucifugus alachua* from several localities in the western part of Alachua County. Intergrades between these two subspecies have been found in caves in the western part of Marion County. *Procambarus pallidus* has been collected in Columbia County, and while it also occurs in the western part of Alachua County, all of the localities known are east of the range of *P. lucifugus alachua*, with two exceptions where both species were taken in the same cavern. The albinistic amphipod and isopdo seem to be confined to the water system in which the *lucifugus* subspecies abound.

If, then, the subterranean water systems are plotted according to the distribution of their crustacean fauna, there seems to be at least four more or less distinct systems.

Numerous extremely interesting problems are raised by the discoveries described above. For instance, what stock or stocks entered the subterranean drainages, and at what time and where?[1] To what extent has the subterranean existence modified morphological and physiological features of these stocks? How extensive is the range of these subterranean animals?[2] Many such problems are being investigated in Florida but a great deal of additional collecting and study will be necessary before any definite conclusions can be reached with respect to the problems mentioned. I have little doubt that many of them will long remain a challenge to students in speleology.

---

[1] A working hypothesis has been proposed by Hobbs, 1942—The Crayfishes of Florida, Univ. of Fla. Pub., Biol. Ser. 3 (2): 12-13.

[2] The present known ranges have been summarized. 1.c.:pp. 92, 136, 138-140, 147-149, 163.

Dr. George Lynn Cross

Dr. George Lynn Cross, who has been serving as acting president of the University of Oklahoma since January 1, has been named as president of the institution. Since joining the Oklahoma faculty in 1934 he has served as head of the department of botany, acting dean of the graduate college and acting director of the University of Oklahoma Research institute.

He holds bachelor of science and master of science degrees from South Dakota State college, and the Ph.D. from the University of Chicago. After receiving his doctorate, he remained at Chicago as a research fellow on a Rockefeller grant.

He is a member of Sigma Xi, the Botanical Society of America, Phi Sigma, the American Association for the Advancement of Science, the Cactus and Succulent Society, Torrey Botanical Club and other organizations.

* * *

The Editor desires to compliment the following chapters, whose members are working so hard to keep the spirit of Phi Sigma going and are striving by their newsletters to bring the members in the armed forces in touch with the doings of themselves and the other members by means of these letters. The chapters are:—Alpha Alpha, and Alpha Lambda. If any other chapters are doing similar work the Editor would be pleased to know.

Alpha Epsilon Delta, national honorary premedical fraternity, sponsored a symposium on Premedical Education at the Cleveland meeting of the Association for the Advancement of Science in September, 1944. The papers presented at the meeting are to be published in The Scapel. The remarks and suggestions submitted will be published in pamphlet form and circulated among premedical teachers and others interested.

Copies of these publications may be had upon request to Dr. Maurice L. Moore, Secretary of Alpha Epsilon Delta, 3853 Lakewood, Detroit 15, Michigan.

Please send in newsletters and papers for publication in the next issue of the Journal.

* * *

Voyage to the Straits of Magellan

Arthur C. Twomey
Field Collector, Section of Ornithology, Carnegie Museum

Reprinted from THE CARNEGIE MAGAZINE

This excerpt from my South American notes covers the voyage of the Vagabondia from Chiloe Island, Chile, to Tierra del Fuego; and back to Huanope Island, off the coast of Peru, during the spring of 1939. The Vagabondia, belonging to W. L. Mellon, of Pittsburgh, a trustee of the Carnegie Institute, was making a round-trip cruise from Miami to Tierra del Fuego, and Mr. Mellon had invited the Carnegie Museum to send me as their representative on the voyage, granting me a rare opportunity to enrich our scientific collections with many valuable specimens.

The party was made up of Mr. and Mrs. W. L. Mellon, E. P. Mellon, Dr. Gunderson, the yacht's physician, and myself. From the hour of sailing on January 31, 1939, it was seventy-seven days until we again returned to Miami. During this period we covered seventeen thousand miles and collected specimens from such localities as Barro Colorado Island, in the Canal Zones; the interior of southern Panama; the vicinity of Lima, Peru—back to the crest of the Andes; Valparaiso, Chile; Puerto Montt, Chile; numerous localities along the inside passages of southern Chile, particularly the region about the Gulf of Penas; Pinta Arenas, Chile; Tierra del Fuego; Galapagos Islands; and Cocos Island. Although time was limited and the distances covered were great, yet through the careful planning of the voyage by Mr. Mellon we were able to achieve our objectives.

If this excerpt from a rather lengthy experience seems overcrowded and intense, it will be because the experience itself was too vivid and too intense for me to feel that I have yet digested it fully. In the southern tip of South America there is a whole order of life so foreign to our temperate order, so much too rich in feelings for our Pittsburgh notions of simple moderation, that traveling leads a visitor simply from one peak of wonder to another, and there seems to be no place of emphasis. There is no pausing in dull moments to reflect upon things seen, or to prepare for what is coming, for there are no dull moments. There is no way to escape the chaos of emotions with which such a country must be viewed. Everything lives in extremes, extremes such as are scarcely conceivable to a person who has not seen them.

There is no desert that is not a superdesert, and no abundance that is not a superabundance. A forest is not simply dense, it is impenetrable. A glacial wall is not merely thick, it is three hundred feet high. Birds and animals and plants exist in such conditions as are not only unusual, but are hitherto almost unheard of. I have chosen to describe a few days at the southern end of the South American continent because they are typical of the life which, especially as an ornithologist, I felt it such a rare privilege to be living, day after day.

The Straits of Magellan and the insides passages are probably described in print, eventually, by every person who ever sees them, for they are the kind of scenery that must be told about. Darwin wrote about it one hundred years ago; and Dana, a few years after, described it from a sailor's angle in "Two Years Before the Mast." On our way into the Straits of Magellan, we passed by many an alluring spot that only great strength of purpose and a very methodical Captain prevented our stopping to see. The last of these that I saw or remember, before we entered the inside channels of the mainland, was Chiloe Island.

It was about five o'clock in the afternoon on a cloudy, dampish day that we began to discern, distantly, the island's outlines. In this part of the world, five thousand miles south of Miami, roughness is all a relative matter. High mountains seem small because other mountains are higher, and the heights of Chiloe Island were seemingly dwarfed and rolling only because we could also see, in the distance, the lofty, snow-capped Cordilleras—which we were approaching—far to the east on the mainland.

Chiloe Island, as we came really close to it, rose stern and forbidding—a violent and dangerous and alluring country, just, somehow, as it should have been. Its natural wall of dark solid rock was incessantly pounded by the turbulent waters of the Pacific. Where the coastal rock was occasionally broken, there lay coarse gravel beaches, giving way abruptly to great temperate rain forests that covered all the rugged land of the interior with a luxuriant blanket of deepest green. Only on the precipitous faces along the coast could the underlying rock surfaces be seen. Night was falling. The roar of pounding waters filled our ears and dark creeping shadows deepened perceptibly as we stood straining our eyes to see into the impenetrable hills of the interior. It was not a place that any adventurer would willingly leave behind, but the yacht kept well out to sea, and we were prevented from any closer inspection of the land.

By the next morning we were well south of Chiloe Island. I woke to a strangely placid and quiet world, to a cabin where no objects rolled or rattled, and to a porthole free from spray. I realized that we had left the Pacific swells behind us and were now in the still waters of the inside channels. This stillness of the water is due to protection afforded by the mountains on either side. But still they have a bad-weather name, for the winds are often blusterous, the skies overcast, and there is almost continuous rain.

During the early hours of the morning the air was wet and gray. Fog drifted thickly about us. We moved along at half speed. The sun as it gradually rose above the towering peaks of the Andes, revealed two snow-covered volcanic cones, majestically lifted above all else, brilliantly glistening and gleaming above fog banks that curtained the bases. The swiftly mounting sun cast over these peaks a slight reddish glow, outlining with warmth the beauty of Osorno's almost perfect cone and the saddle-shaped summit of Corcovado. In recent years both these cones have been active volcanoes, and it is, I suppose, possible that the smoke, or vapor, which I thought I saw rising in a fine cloud from Osorno, was something more than illusion.

At 10 A. M. the fog had cleared, and everyone was at the deck rail for a glorious first view of the great glaciers. Back sometime in the distant past the glaciers began to plough their way through wild rugged mountains of endless forest such as now surrounds them. The brilliant white of the glaciers and the rich green of the forests are sensationally sharpened in color, each by the constant contrast with the other.

Strange flat-topped tree shapes, such as are usually associated with acacia trees and warm climes, dominated the forests. The varied hills to the west of us, where lay the Archipelago de los Chonos, loomed up, as we passed slowly along, in intricate pattern against the sky. There were islands of rugged, sharply broken hills; some islands conical, some gently rolling, and some merely boulder strewn. At intervals we met little channels from the open ocean that transmitted to our channel a slight roll.

It was always at the mouths of these little channels that we saw that great bird, the wandering albatross, a creature of wondrous strength and grace, which circled our boat in a continuous glide, its black-tipped wings absolutely motionless, but catching the slightest air current, sustained in an effortless sailing of both beauty and speed. At times the white birds glided, tipped halfway on their sides, their wings perpendicular to the channel's surface.

At other channels, four to ten albatrosses dotted the gray waves, not attempting to fly unless nearly run down by the yacht. They were so well fed that only with the greatest effort could they lift their heavy bodies from the water. First they would run along the surface for some distance, then, as their long, powerful wings came gradually into play, they would move off, rise abruptly, circle back, and proceed on motionless wings to survey this infrequent disturbance of their channel wanderings. Other oceanic birds appeared in these lateral channel entrances. Sooty shearwaters—the commonest ocean birds in the cool waters of the Humboldt current—streamed in from the open ocean in swirling flocks, until the whole width of the channel flickered with these graceful black-colored petrels. Unaccountably, two lines of the birds were passing each other, going both back and forth, from the open ocean. At intervals, a few diving petrels, black above the white below, bobbed up close to the yacht, looking like little auks. They would at once take to flight, skipping over the surface, their feet just touching it, and then would rise a short distance above the surface, fly a few yards and suddenly, seeming to collapse, would tumble into the sea, vanishing with a splash.

Although the variety and beauty of the scenery kept us constantly on deck, it was difficult to gather any orderly concept of these too quickly moving events. Always there were walls of ice, and those dark dripping forests that seemed to close in on all sides, appearing as if springing from the very sea, so completely did they envelop the shores. Nowhere was there ever a sign of man. All seemed completely untouched from Time's earliest beginning. Certainly, Darwin's description of a hundred years ago fitted the present as accurately as apparently it fitted the past. Perhaps the only notable change in the scene since his day was the change in the volcanoes, Osorno and Corcovado, for on the first morning that Darwin saw the great snow-capped domes towering above the forests, he said:

On the night of the 19th (January, 1835) the volcano of Osorno was in action. At midnight the sentry observed something like a large star, which gradually increased in size till about three o'clock when it presented a very magnificent spectacle. By the aid of a glass, dark objects, in constant succession, were seen, in the midst of a great glare of red light, to be thrown up and to fall down. The light was sufficient to cast on the water a long bright reflection. Large masses of molten matter seem very commonly to be cast out of the craters in this part of the Cordillera. I was assured that when the Corcovado is in eruption, great masses are projected upwards and are seen to burst in the air, assuming many fantastical forms, such as trees; their size must be immense, for they can be distinguished from the high land behind S. Carlos, which is no less than ninety-three miles from the Corcovado. In the morning the volcano became tranquil.

At Elefantes Gulf we penetrated to its southern extremity where the Istmo de Ofque nearly severs the great Peninsula of Taitao from the mainland. Small rocky islands, covered with lush vegetation and tiny sand beaches, were the resting places of Magellanic penguins, blue-eyed cormorants, dolphin gulls, steamer ducks, and kelp geese. To the southeast, enveloped in a veil of drifting fog, sprawled the great San Rafael glacier, coming off the gigantic main glacier like a battering ram that had once crashed its way through the green forests.

At the southern extremity of Elfantes Gulf we dropped anchor and remained for four days. Exploring parties were out from early morning till late at night. W. L. Mellon, with E. P. Mellon and a crew of two men, took one of the launches; Dr. Gunderson, the ship's doctor and I—with seaman Gunner Landin as engineer, pilot, and assistant, and one or two other sailors—took another launch. After each day's exploits, we always talked over our findings, each contributing to the evening his most interesting experiences. Mr. Mellon explored the smaller, hidden creeks with one of the smaller boats—penetrating into all the small bays, looking for new things, and steadily adding to our ever growing collection of specimens. Thus I was free to penetrate the larger inlets and rivers with the large launch, stopping frequently to enter the forests, especially in search of birds and other animal life. Our evenings were always lively and often full of fun. Mrs. Mellon stimulated us all to conversation by her own wide scientific interests and her constant questions about the progress of our work.

In our several weeks at Elfantes Gulf, we never saw a day without rain. The sky often cleared for a few moments at a time, but shortly after, a big, wet gray cloud would roll down off the inland glaciers and fall again in torrents upon the forest slopes. Oilskin clothing and rubber waders were the only possible dress at San Rafael. We were soaking wet from the time we left in the morning until we returned late at night. Wet, boggy ground, dripping forests, driving winds, and soggy skies put an almost constant tone of grey over everything, broken only at rare intervals by the light of a brilliant sun which turned mountains, glaciers, forests, and rivers into a fairyland of melting colors and dreamy unreality. Yet even with constant rain, there was never monotony.

Narrow game trails, some old and unused and others fresh, were in evidence in the forest and along its edge. While we were collecting on the Rio de la Heumules, Mr. Mellon came in to report that he had sighted several deer along the river bank during the morning. Later he went out and was able to catch several specimens. The deer proved to be the Chilean Huemal (Hippocamelus bisulcus) a distinctive deer of these southern Chilean forests. In summer snows it migrates annually to the foothills and nearby plains. The bucks weigh about one hundred and twenty-five to fifty pounds and carry a peculiar set of antlers that have only two forked tines, one extending partly forward and the other quite upright. The face is marked by a broad black line that runs from the muzzle to a point between the eyes where it divides like a Y. Likewise, large exposed glands lie conspicuously below the eyes.

The same deer were next seen along the Rio de la Pascua while repairs were being made on the launch. Fourteen deer—three bucks, nine does, and two fawns—were in one herd. When I approached them they merely moved off a little and watched, inquisitively. Soon a curious doe trotted up to within forty feet of me, but a disturbed buck ran up and prodded her with his antlers and sent her back to the herd. Then the outraged buck focused his attention on the new creature that had dared to enter his domain. It soon became apparent that he intended to challenge me, for he clicked his jaws, shook his head, frothed at the mouth, and steadily moved forward. Since we already had our specimens, I made as graceful a retreat as was possible, much to the merriment of the crew that had come up the river to help with our disabled launch. It must have been amusing to see that little buck measuring each step as he gradually backed me off his feeding range. At any rate, I was able to take a number of photographs, and thus ended the little episode, with each contestant having achieved his objective and no injuries.

The dark forests were characterized by masses of tangled vegetation. At their edges, great masses of fuchsia shrubs (Fuchsia magellanica) some ten to twelve feet in height, were simply covered with drooping, red blossoms. It was this same wild Chilean fuchsia that was first taken to England in 1788. Since that date 841 species and varieties have been developed by hybridization from the original form.

Another shrub that dominates the forest opening and the edge of the forest was a thorny holly-leafed barberry (Berberis licifolia) that has a red and yellow trumpetlike flower. Along with these growths were countless other forms—vines,. tree ferns, grasses, and mosses. Near the water courses were the long white feathery plumes of the tall, graceful southern bamboos.

In the lowlands, great trees towered above all other growths. Many were covered by lichens, mosses, and tree parasites, mistletoelike forms such as *myzodentron punctalatum.* The winter's bark (Drimys winteri) a smooth grayish green barked tree, with large clusters of magnolialike leaves, extended along the coast where they grew from one to three and a half feet in diameter and from forty to eighty-five feet tall.

The most dominant tree forms in these forests were the two southern, small leafed beeches: the evergreen beech and the antarctic beech. The evergreen beech averaged three to four feet in diameter, although the occasional individual attained a diameter of seven feet, fifteen feet above the roots, and ranged to one hundred feet or more in height. The antarctic beech, a deciduous form, was found over a wide selection of habitat preferences from sea level to the high alpine meadows. At sea level and on the lower mountain slopes these trees averaged three to five feet in diameter and forty to eighty in height. But on some of the higher mountain slopes they often formed an impenetrable shrubby growth that covered acres. At the edges of timber line they took on the form of a stunted, wind-twisted tree only five or six feet high, and sometimes grew as a recumbent, matlike shrub that hardly reached more than ten inches from the ground.

The primitive type of cone-bearing conifer, *podocarpus nubigena*, was not abundant, but in some restricted localities, particularly where the large glaciers exert a lowering effect on the atmospheric temperature, these trees grew in extensive stands. This type of forest always had a gloomy and ghostlike appearance because of the great, long festoons of hoary gray lichens (Usnea) which streamed down from the branches of the trees.

Along the banks of the rivers and in boggy places, the rhubarblike, giant umbrella plant *(Gunnera chiensis)* with stems five to seven feet long and leaves six to ten feet across, was found growing in profusion. The natives of the channels use the stems for dyes and the roots for food, but we found the huge leaves excellent shelters during heavy showers.

The big launch would nose into the dense, overhanging foliage of the lagoon shore, and the anchor be thrown into the rank tangle. The sky was often nearly blotted out by the dark rain clouds, and, almost in a night black we would cut our way with the machete into the forests. We could push but a few yards forward at a time, when we would be weary and rest for a little. One day at an abrupt hill we stopped to sit down on a large log, covered deep with moss and lichens. These great temperate rain forests are almost awe inspiring yet there is a feeling of exhilaration as well, sensed only by those who find themselves thrust into one of the few remaining little-known regions of the world. The silence on this day was unimaginable. Not even a patter of rain or the sigh of a breeze broke the stillness. I could somehow feel that each member of our party was as swept by emotions as I was when, suddenly, without warning, a small dog voice barked out from the blackness behind us. The surprise was so complete that I don't know what I expected to see moving from the tangles. But it was only a queer little bird, a russet-breasted, inquisitive little bird, hopping familiarly to a branch less than four feet away from us, and crying, "Chiduco, chiduco," in its odd, hoarse, little voice. It was a cheucau (babbler) and a bird that the Chileans of these regions consider to have supernatural powers. "Chiduco, chiduco," he repeated, giving the call that the Chileans claim to be a good omen. If the cheucau had been giving his other call of "huitreu, huitreu," it would have meant something very unfavorable.

We saw this cheerful little bird in all the dense forests that we visited in southern Chile, only once did we hear the warning cry of "huitreu." It was on our return journey north, when we dropped anchor in the fairyland harbor of Tres Montes. We had entered the great forest by following a tiny, narrow railroad track that connects the lighthouse of the treacherous Pacific coast with the harbor of Tres Montes. The babblers were numerous, coming out of the black forest, each calling, "huitreu, huitreu." We saw two men approaching us. Soon we found that for some reason the Chilean government supply boat had not yet turned up with expected provisions. Eight men in the lighthouse had been without food for over two weeks now, except for the few mussels that they had found along the shore.

When their plight was known, Mr. Mellon made certain that they did not leave the Vagabondia empty-handed. I can still see the smiling haggard faces as they pulled away from the yacht, their dory loaded with provisions until only a few inches of free board was left. What a feast those men must have had that night, warm and fed in their great lighthouse, with the merciful spot of light still shining on that dreaded coast. That evening as we left the Gulf of Penos and rounded the Peninsula of Tres Montes, into the full sweep of the South Pacific, the bright gleam from the lighthouse steadily flashed its warning. Then a most unprecedented thing happened. The light went out for a long moment and then flashed a great beam straight out toward us. Six times they saluted the Vagabondia as a token of their appreciation. Then the light resumed its steady signal of warning to all ships at sea: "Stand clear of this coast." As we pushed forward, the black night became blacker. A wind was rising, as the light of Tres Montes became a speck in the distance and finally vanished altogether.

As long as we were at Elefantes Gulf, I took the opportunity to make a study of the little bird of omens, for the cheucau resumed its own investigation and followed us as we moved. At times these birds would be so tame that we were nearly able to catch them. They always stayed close to the ground, hopping about among the vines and roots, their little stumpy tails held over their backs after the manner of wrens. The cheucau was but one among many that were strange. At the edges of the forests the ruby-crowned hummingbird fed in the huge masses of wild fuchsia blossoms. At times a swiftly flying flock of Chilean parrakeets set up a terrific din as they darted by or flew up and alighted on the lofty crown of an antarctic beech. Out in the cold waters of the lagoon Magellanic penguins hunted for fish, looking very loonlike as they swam along on the surface. In the southern spring these penguins enter the forest and nest in burrows under the rank vegetation. It seemed strange indeed to find hummingbirds, parrots, and penguins all nesting in the same general locality. On some of the large standing, dead trees there were evidences of work by the Magellan woodpeckers. Later, at Puerto Montt, we saw two of these birds with their flaming scarlet crests. They were the size and shape of our northern pileated woodpeckers and resembled them also in color and in call.

Our few days at Elefantes Gulf had been filled with lasting memories. It was only when we were leaving that I suddenly felt as if I were lifted out of a dream. We were leaving the enchanted forests. The broad expanse of San Rafael lagoon was studded with floating blocks of glacial ice; graceful blacknecked swans, frantically swimming ahead of the launch, flapped their molted feathers as we sailed away, to push steadily south.

Cape Froward, the most southerly point on continental South America, stood out in bold relief on the north shore of the Straits of Magellan. All the old-time stories of sailing vessels and of their weeks of toil before any attempted navigation of the Straits at once flooded my mind. As we entered the Straits that morning, the water was quiet, the day bright, and there was hardly a cloud in the sky—a most infrequent experience, it is said, for this vicinity. To the south was the towering, rugged, snow-and-ice-capped mountain of Tierra del Fuego. Great Osorno, the highest point on that rugged land mass, rose to ninety-eight hundred feet above sea level—and looked it! Its twin peaks, glistening white in the sun, rested in a small bank of clouds. The great glacier reached down from its slopes, sprawling out over a tremendous ice field. Land of eternal snow, much of it yet untrodden by man.

Here and there, on the grim, rocky shores of islands, derelicts of once-proud steamers that were unable to steam the raging tempests of the Straits, now lie rusting and breaking up—mute and disturbing evidence of less fortunate navigators than we.

Eventually we reached Punta Arenas, Chile, the most southerly city in the world. It is nestled at the edge of the high foothills of the Andean Cordilleras, which continue on to the west, and at the beginning of the vast Patagonian pampas that stretches off into low-rolling hills, eastward and northward. Punta Arenas is a thriving frontier town, bustling with the activities of a sheep and cattle ranching community. Here we were guests of the Braun family, and while Mr. and Mrs. W. L. Mellon and Mr. E. P. Mellon visited the town and the residential section, I proceeded by car to Mr. Braun's famous sheep ranch, where all of us met later in the day.

The sheep ranch was in a typical pampas region. The pampas stretched out in every direction, resembling strongly the western Canadian prairies familiar to me. The difference that I observed was in the bird life. One of the first things I noticed, on a small green meadow close to a tiny pond was a majestic pair of rheas and their family of five striped young. They were quietly grazing on the plants, but, on seeing us, they ambled off at a surprising, swinging gait over the brow of a nearby hill, making, for a moment, a perfect scene. We watched them vanishing from view, but soon we were aware that a head and a portion of a long neck of the male bird was but partly concealed in a shrubby growth at the crest of a nearby hill. He still watched our every move. Hoping for a picture, we climbed after him as quickly as possible, but our only reward was a glimpse of the great bird as it swung over the crest of the next high ridge.

As we returned to the car, I was startled to hear a cry that really did take me back many thousands of miles to the arctic tundras of Canada. With one mind I saw for a moment both the surrounding pampas with its grass and mossy rolling hills, and the subarctic profusion of small lakes and ponds, as I listened to the wild cry of the Hudsonian curlew. For me, it was a grand surprise to find this familiar North American migratory bird here in its winter home, and in association with rheas, spur-winged plovers, and ashy-headed geese.

Our visit to the pampas was short, as we were anxious to be on our way into the inside passages of Tierra del Fuego. Often we would look off to the south, across the intervening stretch of the Straits of Magellan, toward the "Land of Fire." To the west, the high rugged icebound mountains glistened in the distance; to the east, the island gave way to a gentle slope seeming to disappear into the sea at its eastern extremity. Patagonia, perhaps the most famous sheep-ranch country in the world, is yet one of the last-known places on the globe.

We were pleased to learn that our guide within Tierra del Fuego was to be Mr. Pagels, more commonly known as the "Pirate of the Straits of Magellan," or, locally to the Fuegean Indians, as "Put-Put." We paid a visit to Pagels at his famous old home in Punta Areanas, the meeting place of all the German dignitaries who pass through. His house was outwardly plain, a great rambling structure; but on the inside it was very informally comfortable, lined with pictures of people, of Patagonia, of Tierra del Fuego, and with racks full of old books. Many of the books were scientific reports or popular accounts of explorations into Pagels' country. In all these, Pagels was mentioned as guide, a man ever highly respected and honored for his vast interest and knowledge of all the living things in Patagonia. In the back yard of his house we had interrupted him at his work; six large macaroni, or crested, penguins stalked around nearby in a puddle of mud. Pagels looked up at us from a pile of penguin skins that extended in dozens of great yellow odoriferous rows; ten thousand skins, he told us, were in the shed, ready to be shipped to Europe, there to be made into "leather" goods. Pagels was a man of at least sixty-five, with white hair, and a neat Vandyke; he towered at least six feet, four inches in height. He had great broad shoulders, a deep, pleasant, strongly German-accented voice, and a most kindly face. His welcome to us was one of the heartiest and friendliest I have ever experienced. We were at once his friends, for we had a definite interest in the land that he loved and that he had known now for forty-odd years. He would gladly show us his mountains, his glaciers, his hidden fjords, and the dark forest of his Tierra del Fuego!

Tierra del Fuego, the "Land of Fire," is actually a land where all the storms of the two great oceans of the earth meet together—where snow, sleet, rain, hail, fog, and bright sunshine can all happen in the course of a single day. Glistening glaciers run for miles across the interior plateaus and high peaks. The glacial floods of ice push down into the valleys, tumbling and roaring indescribably as great two-hundred-foot columns of ice break and crash all at one time into the sea. The mountain faces gush with hundreds of cataracts that go falling seemingly into dark green forests of antarctic and evergreen beech trees. The forests are so dense and luxuriant that they grow on slopes rising almost perpendicularly out of the salt water. At intervals, a ribbon of rock two hundred yards across sometimes lies bared, as if a giant finger had suddenly rubbed out a stretch of forest, and pushed it into the ocean; for, from sheer weight, the dense beech forests—many of the trees two to three to three and a half feet in diameter and standing sixty to one hundred feet high—have begun slowly to tear away from their shallow root systems and drop off into the sea.

Pagels showed us his hidden glacial fjord that he called Christmas Night Bay. Rushing torrents of fresh water dashed into the beautiful little harbor. The whole was framed by lofty mountains and the dark green of almost impenetrable forests.

It was wonderful to see the grandeur of such surroundings with Pagels, who was so filled with joy of the country he called his own. At times he would point to a precipitous mountain meadow covered with yellow flowers and repeat: "Beautiful, beautiful, my mountains, my glaciers, the most beautiful in the world!" When we talked of leaving, he would say: "But you have not seen my country, there are more glaciers, more forests, far more beautiful places that I, only, know. I can take you to them. I want you who are interested in Nature as it has always been to stay just a while longer; you have not seen half."

One afternoon, as we were out in the big fishing launch with Pagels, he suddenly became very much excited and started pointing at a cliff that rose sixty feet sheer from the water's edge, crying, "Lobos! Lobos!" But there was nothing in sight—only a pair of black vultures sitting on a small shelf, high up on the face of the cliff. He kept repeating "lobos" and still we could not see any sea lions but as we slipped up closer, a big round head broke the water's surface and then, with a loud splash, a large bull Patagonian sea lion plainly dove. Another sea lion broke water almost under the launch, which was by this time very close to the cliff. It was apparent that the beasts were coming out of a cave from behind the cliff, and that the cave had an underwater exit to the sea. We found a hole, about five feet across, from which we could look down into the large cave. There on the dark rock floor could be seen a female Patagonian sea lion and her young one. The moment we began to move, the female slid into the water, leaving her pup in a state of confusion. All at once, a terrific roar echoed from the dark, gloomy, back chambers of the cave. The noise kept increasing in volume until the rocks fairly vibrated. With this challenge, a great lordly bull shuffled to the top of a smooth, rounded shelf of rock below us. Two beams of bright sunlight, coming from the opposite sides of the high-vaulted roof of the cave, fell full on the great beast's massive body. His dry fur, now bristling, gave him a dark tawny look. There was a tremendous breadth of his powerful neck and shoulders, and with broad head held high, and his mouth open, exposing his long fangs, he bellowed out his uncontrollable rage. He had been disturbed in the solitude of his own cave, where he is the master of a sleek harem. For a full five minutes we watched him as he stood statuelike in his glory, a proud and noble mammal, the beams of sunlight making him appear as a distinguished actor taking applause after an outstanding performance. Soon he moved off and splashed into the water, which seemed to be a signal to the remaining herd, for they piled down from the inner blackness of the den like a stampeding herd of cattle. Suddenly we heard shouts from the launch and looking in its direction, could see Pagels and one of the boys frantically paddling the light dory back toward the launch, for the massed herd diving under their bow was tossing the boat about as in a choppy sea.

As we moved from the cliffs, a black vulture circled high overhead. A big, massive head rose above the surface, rolled over, looked in our direction, and slipped beneath the surface, leaving only a slight ripple. The great bull had vanished, leading his harem away from this unaccustomed disturbance, until solitude should reign once again in his age-old glacial cave.

Back at Punta Arenas we reluctantly left Pagels behind and moved on, from this time forth going steadily northward, following the inside passages of southern Chile. Additional stops were made for further collecting in this vast expanse of temperate rain forests, but I was sharply aware that now we were really heading for home. On the coming day our course would lead us once more on and away, far out to sea.

* * *

Anti-Reticular Sero-Therapy

Bessie Dituri
Alpha Alpha Chapter

On June 23, 1941, just one day after the German armies invaded Russia, news was cabled to the world that Anti-Reticular Cytotoxic Serum had been perfected. However, neither the government nor Dr. Alexander Bogomolets, the discoverer, has ever said that the serum (referred to as ACS) with its further clinical experiments interrupted by the war, as a cure-all.

Dr. Bogomolets organized at a Moscow racetrack a study of fatigue in horses and the relation of special nutrition to the fatigue curves. From these experiments he became interested in a further study of the blood supply and more particularly blood transfusion. When the first international congress on blood transfusions was held and his work later exhibited at the Paris World Exposition it won a gold medal. But what interested Bogomolets most of all was the problem of longevity. He had become the director of the Kiev Institute of Experimental Biology and Pathology and he advanced and developed the fundamental theory behind ACS from his clinical studies and those of his thirty-seven assistants that the connective tissue intercepted and destroyed micro-organisms and determined the general body resistance to infection and its predisposition to cancer and senile changes.

The place of the connective tissue is of enormously greater importance than previously thought, according to this theory, and it follows that this tissue should be conceived as a physiologic system with the following highly significant functions assigned to it:

A. Trophic function—cellular nutrition and metabolism, oxidative processes, formation and maintenance of the constancy of the structure and functions of the connective tissue which forms a very important barrier between the capillaries and the main tissue of an organ or the parenchyma (referred to as the *hemato-parenchymal barrier*). It is considered by the researchers that disorders of the hemato-parenchymal barrier contribute to precocious senescence.

B. Plastic function—active participation in wound, ulcer and fracture healing. Regeneration of tissue.

C. Protective function—1. participation in reaction to infection by manifesting an intense phagocytic activity where anti-bodies are produced. 2. participation in reaction of body to development of new growths such as neoplastic and cancerous.

D. Autoregulative function—autocatalysis resulting in the formation of stimulating substances, especially in the spleen.

E. Mechanical function—osseous and elastic skeleton formed by the physiologic system of the connective tissue.

The Physiologic system of the connective tissue produces substances of a varying chemical nature arranged in the form of fibrills which are either minutely or crudely dispersed, and which fill the spaces between the capillaries and the parenchymal cells, i.e., the hemato-parenchymal barrier. That is to say that connective tissue varies from dense cartilage and bone to very loose areolar tissue.

Inherent in the basic theory is not only the concept of barrier, but also the factor that this barrier is a depot of various nutritive substances from which the cells of the parenchyma obtain necessary energy and plastic resources. It follows that the nutrition of parenchymal cells depends on this barrier and the condition of the barrier.

Constant formation and renewal of the hemato-parenchymal barrier is composed of a series of most complicated biochemical and biophysical processes occurring in the connective tissue. For example, it has been thought that much schizophrenia for which no organic basis can be found is a result of a pathogenic disorder of the microglia, a small connective tissue cell which lies against nerve cells and which may show great phagocytic activity under certain pathologic conditions.

It is thus concluded that the condition of the hemato-parenchymal barrier formed by cells of the connective tissue greatly determines the functional condition of the highly differentiated parenchymal elements, the local and general reactivity of the body, its health and longevity. There is little doubt that disorders of the connective tissue play an important role in the origin of cancer and hypertension, to cite a few examples.

Thus, from the theory, the rudiments of which have been discussed above, led the hypothesis that some substance or other such as a serum might be perfected which could affect the condition of the physiologic system of the connective tissue.

It was assumed that cancer cannot attain its clinical development in an organism whose physiologic system of the connective tissue has sufficient resistance. Doctors Neuman and Leontiev experimented with the effect of stimulating and blocking doses of ACS on carcinogenic transplants and found that blocking doses (large beyond certain very definite quantitative limits) favor development of the transplants. Small doses, on the other hand, stimulate the growth of the line of demarcation between the normal and the cancerous tissue, activate the macrophages, and on the whole sharply decrease the number of positive results of transplants.

It was considered of utmost clinical importance to do specific work with anti-reticular cytotoxic serum on experimental fractures of bones in rabbits. Results of statistically significant numbers of trials indicated that large doses inhibit growth of osteoblasts and prolong knitting while stimulating doses greatly accelerate healing and rapid growth of normal bone callosity.

ACS for use in man is produced by inoculating horses with the cells of the spleen and bone marrow taken from human cadavers. Those who have died a sudden death and possess no infectious diseases are used for this purpose. The concentration capable of stimulating functions of connective tissues is a difficult problem. As far back as 1900, Ilya Mechnikov discussed the importance of connective tissue for the health of the body in a book which was called, "Immunity in Infectious Diseases." Mechnikov himself, however, found it difficult to continue experiments along this line. "Even if all obstacles are overcome," he said, "new difficulties arise in testing the action of different doses of a cytotoxic serum." The degree of concentration puzzled him most. And though, in 1900, he advanced the hypothesis that small doses of cytotoxic serum might strengthen the functions of the body, he died without having arrived at an answer to the problem.

The assistants of Bogomolets, Doctors Varshamov, Leontiev, Neuman, and P. D. Marshuk after many experiments with animals arrived at a concentration of one to a hundred as being best for most purposes. The prepared serum is used in small doses averaging 0.05 to 0.10 m.l.

Anti-reticular cytotoxic serum acts by stimulating the plastic protective and trophic functions of the system of connective tissue. Evidenced by accelerated growth of osteoblasts, formation of bone calluses after fracture, therapeutic effect on schizophrenia caused by disorders of the microglia and efficacy against infections, ACS reveals its influence on the protective functions of the system.

The effects of ACS are manifested by increased permeability of the hemato-parenchymal barrier, dilation of the capillaries, increased monocytosis, increases in the amount of the complement (complex of enzymes) in the blood, and the fact that in many cases erythrocyte sedimentation is restored to normal.

In his summary, given at Ufa, in the Urals, where the Kiev Experimental Laboratory has been moved for the duration, Dr. Bogomolets reported (among others) the following findings:

A. That two stimulating doses of cytotoxic serum from the connective tissue of mice saved the lives of 70 percent of rabbits infected with recurrent typhus, a similar infection having caused up to 100 percent mortality in another series of control animals.

B. Stimulation of the connective tissue with ACS in many cases leads to the disappearance of cancerous tumors in mice.

C. The relapse rate after operations in gastric and thoracic cancers can be considerably decreased by using ACS.

D. Unlike anti-diphtheria and other serums, ACS does not act on microbes but stimulates the cells of the connective tissue itself so that the tissue's condition itself destroys microbes and their toxins. Thus ACS is an active rather than a passive agent for the creation of immunity.

E. The results of frostbite and war wounds are considerably altered and the recuperative quality hastened.

Further research both in Russia and in our own country will bring to light more indications of the degree of validity of these findings, but in the meanwhile they do appear to indicate that the healing power of the nature of the body is the best friend of both patient and the physician against disease.

SOURCES

American Review of Soviet Medicine, Vol. 1, No. 2, Dec. 1943.

Immunity in Infectious Diseases, Ilya Mechnikov. 1901.

Chapter News Letters

Upsilon

—Miami University

President—Roger Wright
Vice-President—Louis Heyman
Recording Secretary—Lura Dasbach
Corresponding Secretary—Nora Wright
Treasurer—Florence Van Ausdal

Upsilon chapter opened its nineteenth year with an address on "Paricutin Volcano" by Dr. W. H. Shideler, of the geology department. Dr. Shideler had spent several weeks in Mexico this past summer and had taken pictures of the volcano. He illustrated his lecture with colored slides.

Twenty-eight prospective members were invited to the November meeting. Dr. R. A. Hefner, of the zoology department, gave a very interesting lecture on "Medicine Men."

Initiation and the customary initiation banquet have been postponed until January, at which time we expect to have Mr. Roberts, columnist for the *Cincinnati Enquirer*, as guest speaker. Mr. Roberts is well known for his column on "Hunting and Fishing."

NORA WRIGHT,
Corresponding Secretary.

Alpha Alpha

—University of Southern California

Our outstanding summer meeting was a picnic and trip through the Griffith Park Zoo. The only disappointing part of the trip was not seeing the elephant. It had died a few days before we held our meeting. The cooperation of the Superintendent and the attendants in providing explanations for our tour was greatly appreciated by the members and their guests. One of the highlights was the farmyard which is maintained for the city children between 4 and 14 years of age. These children may enter this area with an attendant and play with the domesticated animals which are as strange to them as many of the other animals in the Zoo. This may sound strange to persons who grew up in the country or on farms, but a great number of our city children never see these animals.

FRANCES L. CRAMER

Alpha Epsilon

—University of Pittsburgh

President—Mrs. Jean L. Zukas
Vice-President—Margaret McKibben
Treasurer—Margaret Barrett
Secretary—E. Higbee

Difficulty in securing candidates for our officers gave our chapter a late start this year. However, we are pleased with the successful candidates and feel sure the year will be a very good one. Dr. E. Alfred Wolf, associate professor of zoology was the first speaker. His topic was "Visual Art, an Expression of Our Right-handed Behavior." The question he raised was: "Does it make any difference what the painter puts on the right side of the picture, on the left side of the picture, in the center of the picture? If it does . . . why? After seeing the pictures illustrating his points we found that Dr. Wolf's contention, that it did make a difference, was correct. Many in the audience did not see all of the picture if objects were reversed from their normal side for our vision.

One of our members, Dr. Edward Claus, formerly with the School of Pharmacy has accepted a position with the University of Porto Rico. He is now professor of Pharmacognosy and Pharmacology.

Our Biology department, which had been moved from the Cathedral of Learning to Alumni Hall has now started to move back to the Cathedral. We are hoping the entire department will be back by June.

Alpha Pi

—University of Colorado

President—Eugene Nelson
Vice-President—Ruth Robinson
Secretary—Louise Hering
Treasurer—Betty Linger

The following were initiated last June: Harris Bernhisel, Caroline Combs, Louise Hering, George Kitagawa, Betty Linger, Eugene Nelson, Ruth Robinson, Jeanne Shotwell, Frank Stangl, and Mary Taguchi.

The Scholarship Award Certificate was given to Miss Catherine Brown by Dr. Gordon Alexander, head of the Department of Biology.

A second initiation was held in August for seven members at the home of our sponsor, Dr. Norma LeVeque. The new members are as follows: Lou Ella Brown, Helen Fearing, Verna Haubold, Eugenia Henke, Dorothy Kingsbury, Donald Turner, and Ernest Van Gerpen. Following the initiation Dr. LeVeque graciously showed her Kodachrome slides of Rocky Mountain scenery, all of which were taken near Boulder.

LOUISE HERING,
Secretary.

Alpha Xi

—Rhode Island State College

President—Joseph Daly
Vice-President—Elinor Newmarker
Secretary—Nancy Thornby
Treasurer—Joseph Daly (Acting)

* * *

Book Reviews—New Books

Except for the signed reviews, the thumbnail sketches of current biological literature appearing in this section are not meant to be exhaustive or deeply critical. They aim to survey the rapidly growing field of biology. Naturally these reviews represent the candid opinions of various readers not necessarily those of the National Council, nor even those of the Editor.

THE WOODS HOLE BIOLOGICAL LABORATORY by FRANK R. LILLIE, *IX—284 pp., University of Chicago Press, 1944. Price $4.00.*

With some help from others (principally Dr. E. G. Conklin of Princeton), Dr. Lillie presents in this small volume (1) the early beginning of seaside biological laboratories in Europe and America, (2) the foundation and early struggles of the Woods Hole Laboratory, (3) the gradual growth of the institution together with its inter-relations with other institutions and foundations, (4) the present plant and its administrative organization, (5) a survey of teaching and research accomplished, emphasizing the first twenty years, (6) biographies of several of the early leaders, (7) the growth of the library and of publications (especially of the Biological Bulletin), (8) the development of and inter-relations with both the earlier established U. S. Bureau of Fisheries station at Woods Hole and the Wood's Hole Oceanographic Institution which "sprang full fledged into existence" in 1930.

The first 191 pages constitute the main text. The remainder (except for the index) presents various documents (letters, committee reports, financial records, lists of officers, etc.) directly or indirectly concerned with the history of the laboratory. In this way valuable source materials for students of biological history are made readily available without interruption of the main story. By use of this little volume one may secure in one evening a bird's eye view of the development of this laboratory or he may spend hours analyzing the materials in the appendicies to secure a more scholarly historical understanding.

The illustrations are good. This reviewer found especially enjoyable pictures of various leading investigators taken in the full flush of their young manhood. These may be compared with other pictures of some of these same workers taken many years later when they had grown old in the service of science and of the laboratory.

Personalities, particularly of the early leaders, are so interwoven with the story as presented that one is forced to see clearly that the present success of the laboratory is largely an integration of the major successes (both personal and professional) in the lives of these leaders.

Only a single (and very mild) adverse criticism may be ventured of this as a historical document. This is that the author's understanding modesty has apparently prevented his doing justice to his own very great influence during more than a half century's important connections with the laboratory, many of these spent in service as an officer, including the office of director. Also, the price seems high for so small a volume. However, if one judge by content rather than by volume, it is altogether too low. This is a superb book.

ARTHUR BRAGG

STANDARDIZATION OF VOLUMETRIC SOLUTIONS by BRADSTREET. *The Chemical Publishing Company, Inc., 26 Court Street, Brooklyn 2, N. Y. Price $3.75. 1944.*

A handy book for the research chemist or the chemist busy analyzing the contents of various chemical compounds. Methods are presented for the man too busy to hunt long for what he needs. He is given a definition for a normal solution and has explained what a fractional normal solution contains. This is followed by standardization of volumetric solutions. Methods are discussed and tables and equations are given along with means for calculating normalities. Indicators are defined and explained as well as a group of standard solutions of acids and bases, precipitation reagents and oxidizing reagents. Logarithms of volumetric factors based on the value of a normal solution are included, as well as hydration temperatures. At the end tables of number logarithms are given.

SOYBEAN CHEMISTRY AND TECHNOLOGY by KLARE S. MARKLEY and WARREN H. GOSS. *Chemical Publishing Company, Brooklyn, N. Y. 1944. Price $3.50.*

Even though the soybean has been one of the oldest crops cultivated by man it is only recently that much work has been done with it. The present work deals with a chemical study of the bean. The composition and properties as well as all the products such as oils, glycosides, pigments, phosphatides, the different methods of extracting, solvents, pressing, etc., are included in this discussion. Everyone engaged in vegetable oil and protein trades as well as students, research workers and others will find a use for this book. A research worker will find it to be a most complete work on the Soybean and its products. Information can be found on the manufacturers of Processing Equipment as well as a long list of Soybean Processing Mills in the United States. A book to be recommended for all chemical and technical libraries.

ANCIENT AND MEDIEVAL DYES by WM. F. LEGGETT. *Chemical Publishing Co. Brooklyn, N. Y. 1944.*

The historical facts concerning the vegetable dyes Madder, Indigo, Woad, etc., are brought out and one learns how color was considered to be a great necessity and took its place beside food as a need in the everyday life of the primitive peoples. The book is easy to read and explains how the earliest people found color from stains of fruit, berries and many other things. Any one interested in dyes will find it to be of educational value.

VIRUS DISEASES IN MAN, ANIMAL AND PLANT by GUSTAV SEIFFERT, *Philosophical Library, New York. Price $5.00. 1944.*

No attempt has been made in this book to make a complete survey of the enormous field of Virus. Only the most recent works have been included. However, the reviewer does not wish to give the impression that the subject has not been carefully covered because historical data has been included along with the most recent developments of serological methods showing that virus-neutralizing substances are in the serum including agglutination, precipitation, complement binding and the cross immunization test.

The reader will be given many ideas of where gaps exist in our present knowledge and at the same time it will be an introduction to many who wish to study some of the open questions. Information is given on Variola and vaccine, questionable virus diseases of man, mammals, and birds. Encephalitis epidemica of man, pox of cold blooded animals, virus-like organisms, Rickettsia, Bacteriophages, etc. are discussed. Methods for virus investigation are also given.

A book to create a desire on the part of the investigative type of reader to make researches and add to the general knowledge of the field.

TEXTBOOK OF HISTOLOGY by COWDRY. 3rd Edition. *Lea & Febiger. Philadelphia. 1944.*

This edition has not been changed as far as the presentation of material is concerned. The blood vascular system as well as structure and function are described in their natural environments. The book has been written so that fundamental facts can be revealed without having to be hunted. The photomicrographs are excellent and give a definite picture of the parts of the body they represent. The work has been organized to be of greatest use to medical students as well as zoologists interested in histological problems.

FUNDAMENTALS OF BACTERIOLOGY by FROBISHER. *W. B. Saunders Company. Philadelphia. Price $4.00. 1944.*

The third edition differs from the second in that it has been organized to be of greater usefulness to the teacher. Some of the things such as characteristics and taxonomy of the second edition have been omitted. Many new illustrations have been added as well as new material on penicillin, cultivation methods using chick embryos, the electron and fluorescence microscopy, typing, and poliomyelitis and lymphopneumonia venereum. A new chapter on pleuropneumonia as well as discussions of sulfonamid drugs, metabolism, bacteriostasis, paracolon organisms and ultraviolet light have been added. Due to the rapid advances in the work on viruses an expansion of the account of this material has also been added.

Chapter bibliographies have been added. Cross-references have been used which have made the book of greater usefulness than its predecessors.

An excellent chart showing the production of Industrial ethyl alcohol manufacturer is well worth having. The diagrams and pictures are useful. All teachers will find this book of great help to them whether they are teachers of bacteriology, hygiene or any allied subject.

▽ ▽ ▽

SUBSCRIPTION BLANK

Detach this page, fill out blank spaces, include check or money order and mail to Mr. Stewart.

Date ....

To Mr. E. H. STEWART,
Treasurer of Phi Sigma,
Mesa, Colorado.

Dear Mr. Stewart:

I am enclosing $.............................. for my subscription to THE BIOLOGIST in the class checked on the schedule below:

1 Year:	$ 1.00..........
3 Years:	$ 2.50..........
5 Years:	$ 4.00..........
10 Years:	$ 7.50..........
25 Years:	$15.00..........
Life Sub:	$25.00..........

Name ....

Address ....

....

Within Reach of Your Chapter Finances

INITIATION INSIGNIA

Does your Chapter carry out the Ritual of Initiation properly? In other words, has your Chapter the model Phi Sigma Key and the large Phi Sigma Coat of Arms required by the Ritual? They are both in easy reach of every Chapter's finances.

The Model Key, furnished in two colored gold, costs only $1.75.

The Coat of Arms, hand-colored on 12x16 heavy paper, only $1.25.

Address all orders, and make all checks payable to the Secretary, Dr. A. I. Ortenburger, Department of Zoology, University of Oklahoma, Norman, Oklahoma.

PHI SIGMA JEWELRY

Membership keys may be obtained from the National Treasurer through Chapter Treasurers, or directly. In the latter case give your name, Chapter and year of initiation, *plainly*.

REVISED PRICES OF KEYS

Standard Size (official) 10K gold	
Swivel ring top	$5.50
Stationary ring top	5.00
Swivel ring top; mounted as pin; safety clasp	6.75
Stationary ring top; mounted as pin; safety clasp	6.25
Small Size 10K gold	
Swivel ring top	5.00
Stationtary ring top	4.50
Stationary ring top; mounted as pin; safety clasp	5.50
Green gold keys, additional	2.00
White gold keys, additional	5.00

To the foregoing prices 20% must be added to cover Federal defense tax.

Address correspondence to:

Mr. Erwine Hall Stewart,
Treasurer of Phi Sigma,
Mesa, Colorado

The Duties Of The Chapter Secretary

To the National Secretary:

1. At the beginning of each school year furnish the names *and* addresses of chapter officers.
2. Order all chapter supplies well in advance of time needed.
3. Order certificates at least two weeks before initiation date.
4. Send initiation fees and membership record blanks at time certificates are ordered.
5. Be sure that copies of THE BIOLOGIST are received by *all* members including faculty and honorary members.

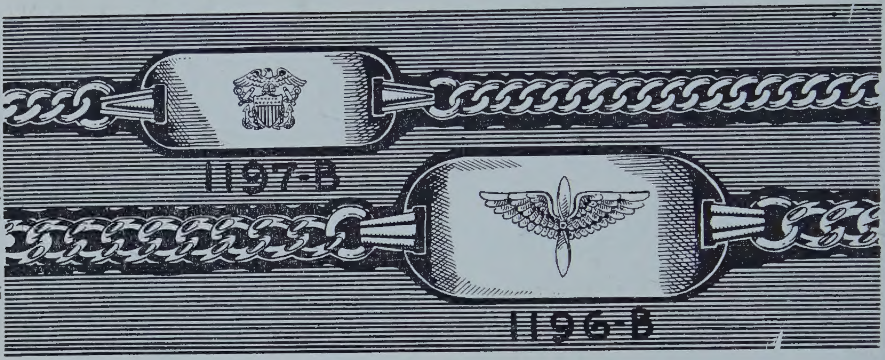
To the National Treasurer:

1. Furnish correct list of chapter officers and addresses.
2. Inform the national treasurer at least a month in advance of the correct number of BIOLOGISTS needed for all your members.
3. Report name, serial number and date of initiation of each initiate at time certificates are ordered.

To the Editor:

1. Furnish a correct list of chapter officers and addresses.
2. Send chapter news letters for BIOLOGIST at least four weeks in advance of publication.
3. Send in copies of outstanding biological lectures or addresses (not however research reports) delivered at your institution.
4. Send in helpful suggestions or constructive criticisms concerning THE BIOLOGIST.

K



On ACTIVE DUTY

MEN IN ACTIVE FIELDS OF SERVICE — whether in India, Italy, the E. T. O., or in the islands of the South Pacific — wear Balfour identification bands mounted with their fraternity crest or service insignia, and engraved with name, serial number, and blood type.

Both of the crash tags shown above are made of rugged, soldered links which will stand up under strenuous use on active duty. The panels are heavy and a generous size for engraving.

M-1196-B Men's length 7¾″
W-1196-B Women's length 7″

Sterling Silver	$4.75*
⅛ 10K Gold Filled	8.50*

M-1197-B Men's length 7½″
W-1197-B Women's length 7″

Sterling Silver	$4.00*
⅛ 10K Gold Filled	6.00*

**Federal Tax of 20% must be added to above prices.*

ENGRAVING . . . 5c per letter additional. Name, serial number, blood type, etc., may be engraved. Specify if wanted on front or back.

Service Insignia Available

ARMY SEAL	NAVY SEAL
ARMY PILOT WINGS	NAVY PILOT WINGS
WING AND PROPELLER	NAVY ANCHOR
COAST GUARD	MARINE CORPS

also

WAVE, WAC, TANK, ENGINEERS, SIGNAL CORPS, MEDICAL CADUCEUS, PARACHUTE WINGS, QUARTERMASTER.

1944 BLUE BOOK

Military pass-case billfolds, service rings, lockets, other identification bracelets, leather photo frames and billfolds, sweetheart gifts.

MAIL POST CARD FOR *FREE COPY*

Official Jeweler to Phi Sigma Society

L. G. BALFOUR COMPANY
ATTLEBORO MASSACHUSETTS